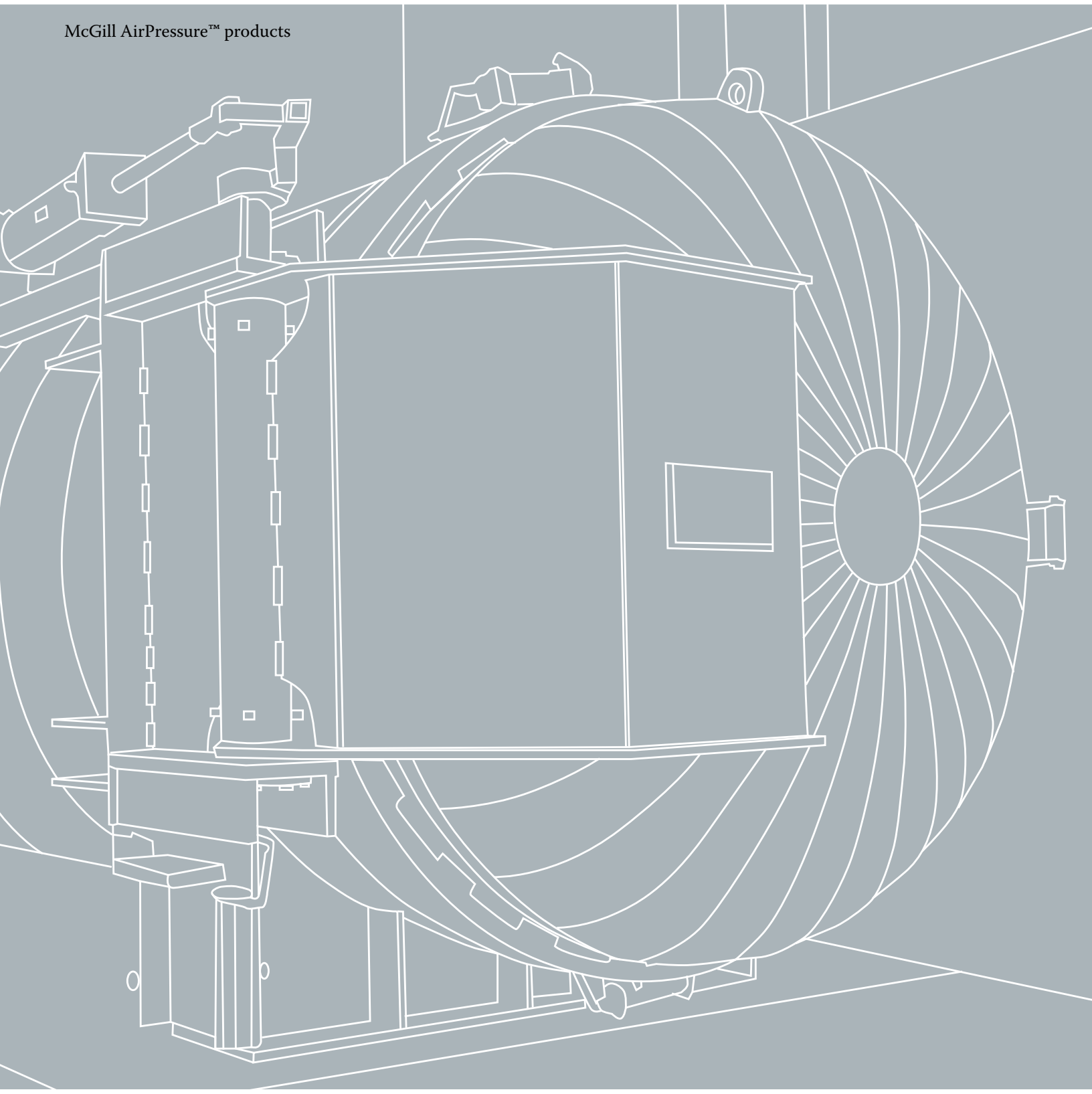
AUTOCLAVE SYSTEMS

United McGill® products

McGill AirPressure™ products



McGill AirPressure LLC

An enterprise of United McGill Corporation – Family owned and operated since 1951

1960s

1980s

1970s

1990s to date

COMPANY HISTORY

United McGill Corporation was founded in 1951 as United Sheet Metal and Engineering Company, in Columbus, Ohio. It was United Sheet Metal that purchased Biggs Boiler Works (founded in Akron, Ohio in 1887) in 1960; the company was renamed the Biggs-United Division, and later Biggs-United became McGill AirPressure LLC, a subsidiary of United McGill Corporation. Today we manufacture a wide range of sizes and types of autoclaves, including full-sized production autoclaves; Mini-Bonder™ autoclaves, used for research and development and small production; live steam autoclaves, used for vulcanization, rubber curing, concrete curing, and medical waste sterilization; impregnation systems; and digesters.

"Since 1951 United McGill Corporation has been family owned and operated. We are an American manufacturer that continues to provide dependable, high quality products for our customers. Our belief in quality, service, and customer satisfaction is why we are proud to market all our products under the McGill family name."

James D. McGill, President
United McGill Corporation and Affiliated Companies

OUR PHILOSOPHY

Meeting Customer Needs

McGill AirPressure adheres to a philosophy of providing customers with high quality, high value autoclave systems that meet their specific process and budget requirements. We consider ourselves a "solution provider" that invests the time required to fully understand each customer's unique process. This allows us to recommend an autoclave and the ancillary equipment best suited to meet your needs. Unlike other autoclave manufacturers, McGill tailors its autoclave systems to meet the needs of the customer's process rather than having the customer alter its process for the available equipment.

Providing Safety, Reliability, and Performance

Another tenet of our philosophy is ensuring that our autoclaves operate with maximum safety, reliability, and performance. The safety systems included on all McGill autoclaves exceed the requirements of insurance underwriters. Many McGill autoclaves manufactured 50 years ago are still in operation and providing safe, dependable service.

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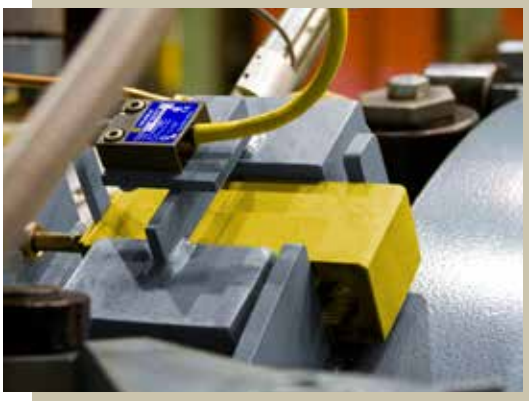

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1. Our comprehensive safety system to prevent accidental door opening during autoclave pressurization includes the mechanical stop and electro-pneumatic locking pin shown, as well as a pressure gauge and zero pressure switch.

2. Radiographic testing is used to check the integrity of welds.

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1. *Bay Seven of McGill's Columbus, Ohio manufacturing plant was built specifically for the fabrication and assembly of pressure vessels.*
2. *Our engineering department uses the latest 3D modeling and pressure vessel design software to optimize autoclave designs.*
3. *We have the manufacturing, construction, and project management experience to perform on-site assembly and installation of your autoclave system.*

CAPABILITIES AND EXPERIENCE

Engineering

McGill AirPressure has the engineering and manufacturing capabilities to produce some of the world's largest and unique autoclaves. We have a comprehensive, experienced engineering department including the disciplines of structural, mechanical and electrical, and controls and process engineering. Our engineering staff works closely with the customer making sure the autoclave system meets expectations in all areas.

Manufacturing

Our 210,000 sq ft manufacturing plant in Columbus, Ohio is staffed with highly skilled craftsmen using the latest computerized fabrication equipment and manufacturing techniques. The plant has a 60- by 500-ft bay built specifically for the construction of large pressure vessels. This facility, with 50-ton bridge crane capacity and 36 ft of hook clearance, can handle very large autoclaves.

Our manufacturing capabilities are not limited by the size of our plant, because we have extensive experience in on-site field construction of extremely large autoclaves. Whatever size autoclave you require, McGill AirPressure has the capabilities to assure its successful completion.

Codes

McGill AirPressure has designed and built autoclaves to meet the requirements of the following codes*:

Mechanical	Electrical
ASME, Section VIII, Division 1	National Electric Code
Canadian B5I (British Standards Institute)	CSA (Canada)
European Pressure Equipment Directive (PED)	European CE

**When required, McGill systems can be designed to meet many other applicable codes and standards, such as ASME Power Piping, UL, and NFPA.*

Complete Systems

McGill AirPressure can provide you with a complete autoclave system. In addition to designing and manufacturing the appropriate autoclave for your requirements, we can also recommend and provide the necessary ancillary equipment to assure optimum performance of the system including control hardware and software, for meeting specific operating requirements. Our experienced field service team is available to supervise installation, see that startup goes smoothly, and train your operating and maintenance personnel to maximize performance and uptime.

Maintenance

McGill AirPressure can assist you in maintaining your autoclave to keep it operating safely and at maximum performance. We can provide technical support for your personnel or offer our experienced technicians and engineers to troubleshoot and solve problems that may arise. We offer a complete service program to inspect, maintain, repair, and refurbish autoclaves. Inspection contracts are available to help meet insurance needs and comply with government regulations.

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1. *Vacuum racks with instrumentation and valving are assembled for a McGill autoclave installation.*
2. *McGill AirPressure offers a full range of inspection services with detailed service reports and recommended repairs and maintenance actions.*
3. *An electric heater and cooling coil assembly for a McGill autoclave interior is mounted on a cart for easy installation and maintenance.*

Mini-Bonder autoclave systems are shipped completely assembled, piped, and wired. The system's internals include insulation, sheet metal shroud, ductwork, blower, blower drive assembly, electrical heater assembly, and cooling coil.

PRODUCTS

Mini-Bonders™

At the time of its introduction in 1983, the Mini-Bonder was the first standardized small autoclave available for research and small-scale production. McGill has now incorporated modern design and manufacturing techniques into the new Mini-Bonder 21 and 36 models, offering larger internal workspace and better performance at lower cost.

Key Benefits

- Lower initial cost and reduced operating and maintenance costs
- Versatility of production and bonding capabilities
- Internals arranged to provide the largest workspace possible

Each Mini-Bonder autoclave system is supplied completely assembled, piped, and wired with the same rugged features and sophisticated processing controls as our large-scale autoclaves, offering years of trouble-free operation.

Four standard models are available:

Model	Workspace Dimensions (inches)	Maximum Operating Pressure (psig)	Maximum Operating Temperature (°F)*
Mini-Bonder 21	21 x 15 x 36	150	450
Mini-Bonder 21HP	21 x 15 x 36	270	700
Mini-Bonder 36	36 x 28 x 48	150	450
Mini-Bonder 36HP	36 x 28 x 48	270	700

*Custom pressure and temperature ratings are also available.

Features

All Mini-Bonder autoclaves include the following standard features:

- Pneumatically operated quick-opening door
- Vacuum system including vacuum pump
- Internal cooling coil
- Incoloy sheathed heating elements
- PLC-based autoclave control system or PC interface

Applications – not only bonding

Mini-Bonder autoclave systems are not only used for bonding. You can also test materials and processes or do limited-production work at a fraction of the cost using a larger autoclave. Mini-Bonders can easily perform a variety of applications:

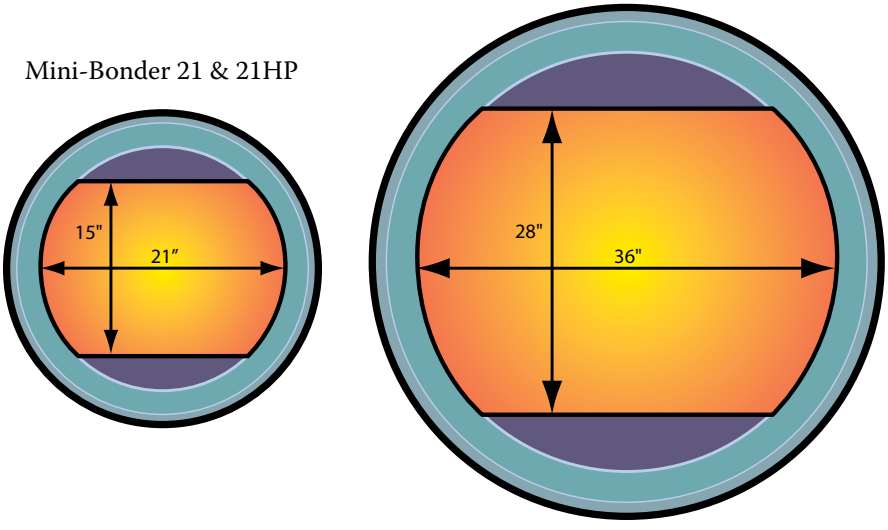
- Composite materials bonding
  - graphite-to-epoxy
  - honeycomb structural
  - glass-to-metal
- Glass laminating
- Printed circuit board laminating
- Sterilizing
- Rubber curing and vulcanizing

Small-Scale Production

The Mini-Bonder is the perfect solution for small-scale production, when the size and expense of a full-size autoclave is not justified. It offers the same processing capabilities as our full-size systems but in a smaller package and at a lower cost. It allows you to bond, cure, and laminate a wide array of materials economically in small quantities.

Mini-Bonder 36 & 36HP

Mini-Bonder 21 & 21HP



Mini-Bonder internals are arranged to provide the largest possible workspace.

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Composite Bonders

McGill AirPressure's bonding autoclave systems are used to bond a variety of composite materials and products, such as polyamides, graphite-epoxy combinations, and many others. Each of our full-scale bonding autoclaves is custom designed to meet each customer's specific requirements including temperature and pressure specifications.

Applications:

McGill AirPressure has provided bonding autoclave systems to most of the world's major aerospace and automotive manufacturers, in some instances up to 26 feet (7,900 mm) in diameter. Our autoclaves are currently being used in the fabrication of composite aircraft airframes, fuselages, wings, body skins, and helicopter blades; the structural frames of communication satellites; and automotive chassis parts, body panels, and seats.

Glass Laminators

McGill AirPressure's glass laminating autoclave systems uniformly bond glass and plastic surfaces together. Our autoclaves are designed to provide uniform flow for a wide variety of glass lamination applications, including automotive, architectural, and ballistic glass. Robust mechanical and electrical systems ensure maximum uptime and performance.

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1. We have engineered and manufactured some of the largest and most sophisticated autoclave systems in the world. We supplied this 15-foot diameter by 55-foot-long vessel as a part of a twin-autoclave system for a major aircraft manufacturer.

2. This McGill glass laminating autoclave is being used to make automobile windshields.

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Live Steam Autoclaves

McGill AirPressure's industrial, ASME-code-certified live steam autoclaves are built for reliability, ease of operation, and optimum performance. Each autoclave is designed with a quick-opening access door and a multistage safety system that prevents accidents during operation. We can custom build a live steam autoclave that can effectively and efficiently perform vulcanization, concrete curing, medical waste sterilization, and processes for other applications.

Vulcanization

McGill AirPressure custom-built vulcanizers and rubber-curing autoclaves are available in a variety of designs, pressure capabilities, and sizes. Each vulcanizer is engineered to meet the specific requirement of your operation and provide you with the shortest cycle times possible. We have built some of the largest off-road tire heater presses in the world, including a press 240 inches in diameter that stands five stories high.

Concrete Curing

McGill AirPressure's concrete curing autoclaves are designed to provide better moisture control and eliminate efflorescence. Through our engineering experience, we have been able to address the typical problems that plague other systems such as corrosion, thermal expansion, temperature uniformity, control system temperature feedback, and debris collection in condensate lines.

Medical Waste Sterilization

McGill AirPressure's medical waste sterilization (MWS) autoclaves are designed for sterilizing medical wastes, infectious waste, and other materials. The MWS series features a breech-lock door with an air-energized gasket that extends the door's working life. A key-lock control prevents unauthorized personnel from changing cycle parameters. A low-profile track makes it easy for workers to load and unload the autoclave and for the autoclave to be easily integrated into a medical cart dumper system.

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1. McGill engineers perform a final inspection on an 8-ft-diameter by 30-ft-long, high-pressure, live-steam vulcanizer prior to shipping.

2. McGill specializes in providing fully-integrated production-size autoclave systems like this vulcanizer being used to cure rubber hose.

3. McGill designed and manufactured this group of rubber curing auto-claves for a major supplier of large off-road tires.

4. All McGill MWS Series models incorpo-rate the most advanced, cost-effective design features configured to meet each customer's requirements.

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McGill AirPressure's rotary globe (1) and cylindrical digesters (2) are used to process ore, paper, and fibrous materials.

Digesters

McGill AirPressure's rotary globe and cylindrical digesters offer the versatility of temperature, pressure, and mixing control and the reliability required to withstand hostile environments of simultaneously applied high temperature and high pressure and acid/alkaline solutions. Our digesters are available in sizes up to 20 feet (6,100 mm) in diameter.

Key Benefits

- Enhanced reaction rates through a unique blending and folding agitation
- Improved low-grade ores through acid or caustic leaching of impurities
- Successful blending of dry materials subject to degradation or caking
- Successful dissolving and removal of desired material through liquid phase

Vacuum Pressure Impregnation (VPI)

McGill AirPressure's VPI systems are offered as an optimum equipment package with properly-sized, high quality vacuum systems, resin storage and handling equipment, and process control instrumentation.

Our VPI systems come fully equipped with the impregnator, storage tank, vacuum source, vacuum and transfer valves, and piping, and feature quick-opening doors. The systems may be horizontal or vertical. Working diameters range from 2 to 15 feet, and any length may be specified. Systems can be automated to meet your requirements.

Applications

We provide VPI systems for very specialized applications and also for service shops in the electric motor repair industry that are used to impregnate motors, generators, transformers, switchgear, condensers, and other components.

Features

- Large size electrical apparatus capacity
- Higher voltage and temperature ratings
- Greater chemical, solvent, and moisture resistance

1. This custom stainless steel impregnation system includes jacketed, hot oil impregnation and storage vessels and transfer piping.

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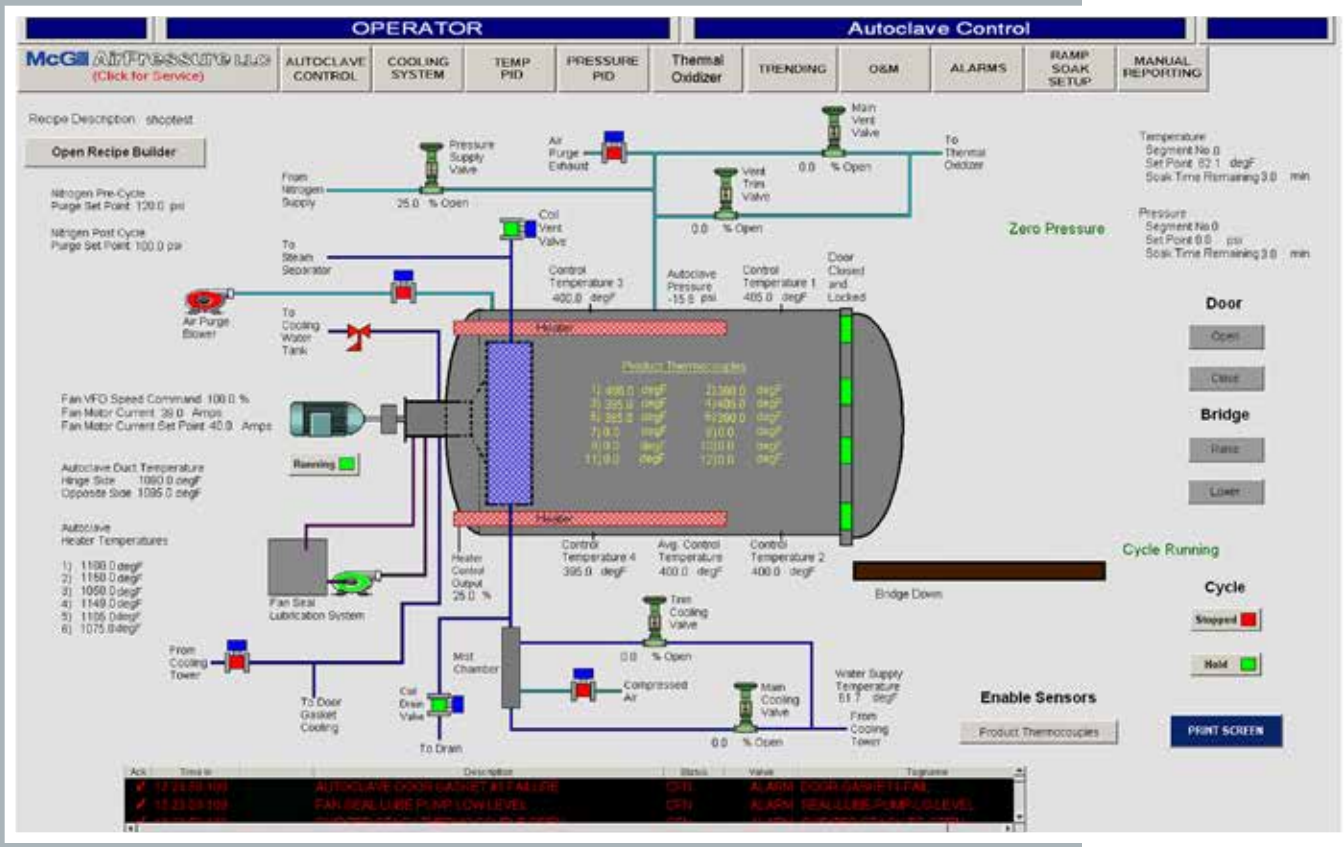


McGill AirPressure's control systems provide a user-friendly environment, computerized cycle control, and full-function, programmable machine control.

CONTROLS

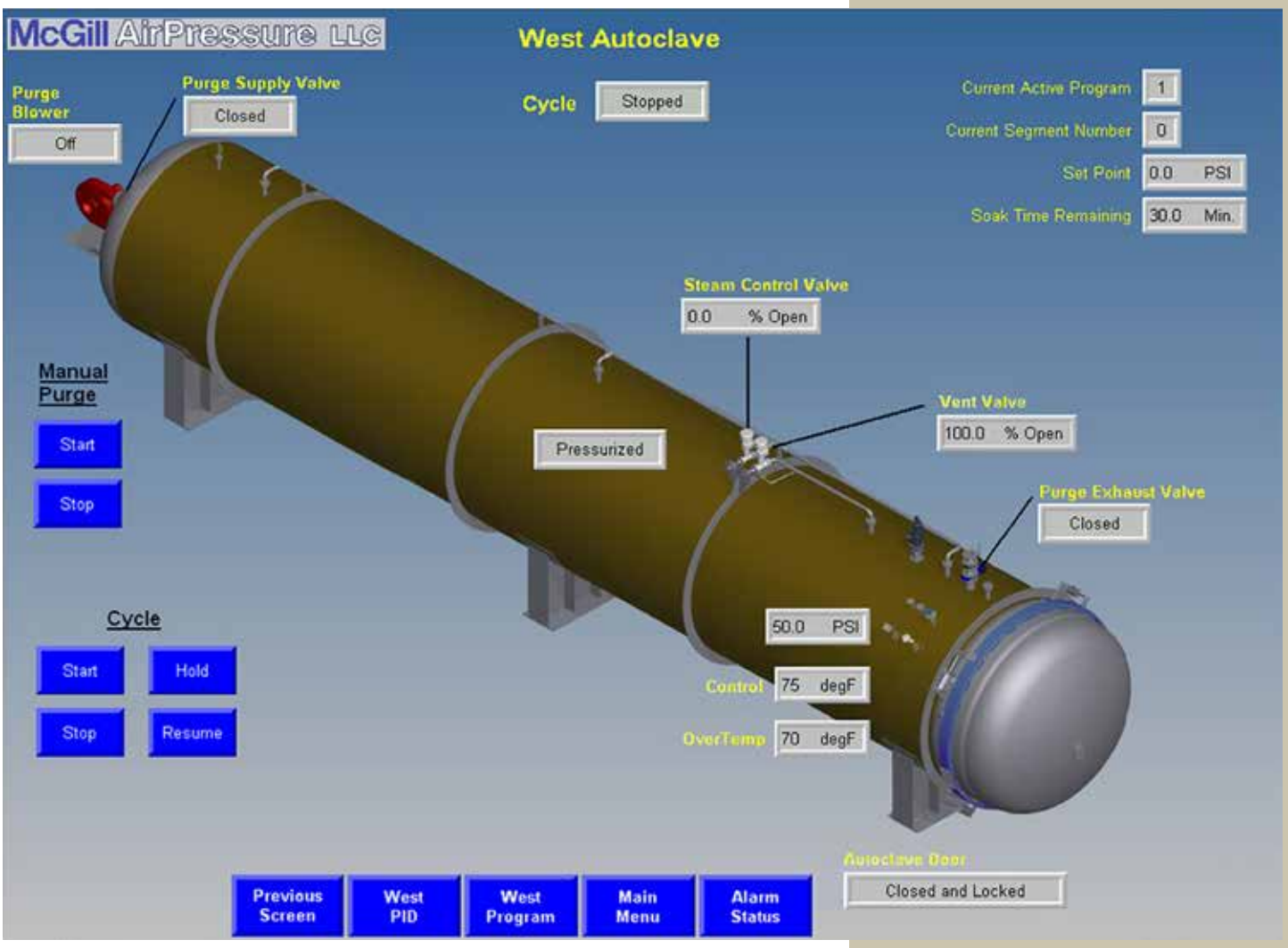
McGill AirPressure offers control systems to meet your specific application requirements. Each system enables you to control and monitor all autoclave functions: pressure, vacuum, heat-up rate, soak period, and cool-down rate. All are designed to make your autoclave easy to operate.

Custom control systems, not "one size fits all"

Each customer and application has unique requirements. In some cases, highly sophisticated control algorithms are needed to ensure proper autoclave cure cycles and minimize defective parts. Other applications do not require sophisticated cure cycles, but need ease and flexibility in programming. McGill offers control systems designed to meet the specific needs of each customer.

Less training required

Our control systems are programmed to minimize operator training. The system will operate smoothly because we employ a sophisticated, easy-to-use and understand PC-based operator interface. A graphic representation of the autoclave enables the operator to quickly determine status of autoclave parameters and components.



Easy-to-read, logical screens give the operator complete control over all autoclave functions: heat-up rate, soak period, cool-down rate, pressurization, depressurization, and vacuum.

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SERVICES

McGill AirPressure offers rebuilds, upgrades, and replacement parts along with complete testing and on-site inspection services for existing autoclave systems.

Field Service

McGill's highly trained technicians and engineers can perform thorough inspections of your autoclave system at your facility. We are able to inspect the equipment's pressure, vacuum, hydraulic, heating, cooling, auxiliary, and control systems. We provide complete field service reports, detailing any problems with the maintenance or operation of the equipment, and recommend specific solutions. If repairs are needed, we are capable of performing the work authorized by the customer.

Rebuilds and Upgrades

McGill can rebuild your existing autoclave and transform it into a completely functional, reconditioned unit or upgrade it to meet new processing and production requirements. A complete rebuild facility is located at our plant or the rebuild can be accomplished on-site under our supervision. We provide corrosion repair, vessel enlargement, heat source modification, and the addition of auxiliary systems. We can also rebuild autoclave doors to like-new condition to provide years of additional service.

1. *We can provide periodic inspection and door realignment to keep your autoclave operating safely and at maximum efficiency.*
2. *McGill has the trained personnel and equipment, such as this large vertical boring mill, to perform the precision machining required for autoclave door rebuilds.*
3. *Whether it involves using existing components or new ones, our system rebuilds and upgrades are performed in the most cost-effective manner.*

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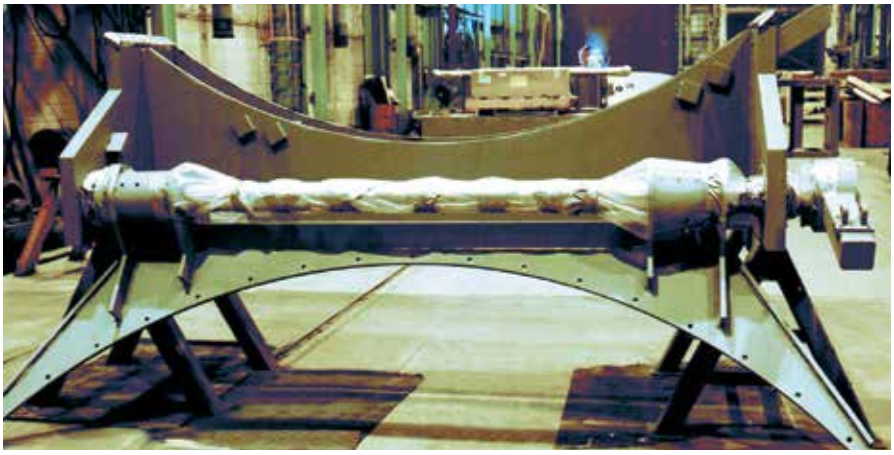

Parts

If replacement parts are needed, McGill AirPressure provides them, including fan shafts, cooling glands, door hinges, and heating/cooling coils that are made to original specifications. Parts for McGill AirPressure, United McGill, Biggs, and J.P. Devine equipment are made to original specifications; and for equipment from other suppliers, we have the capability to fabricate parts that match original manufacturers' specifications.

Gaskets are available from stock and normally ship within 24 hours. If a special order is needed, McGill AirPressure can fabricate a gasket to fit most autoclaves. We can also get a custom extrusion die, or purchase a special gasket compound, for your application. McGill AirPressure can help in choosing the right gasket type, size, and material, and will provide free installation instructions for all our gaskets.

VACUUM DRYERS

McGill AirPressure also designs and manufactures vacuum drying systems for a wide variety of materials and industries. Our vacuum dryers are indirect heated, batch-type dryers for heat-sensitive solids. They remove moisture by exposing the solids to reduced pressure. Just enough heat is used to replace that lost through vaporization. Dryer types include shelf, conical, and rotary designs.

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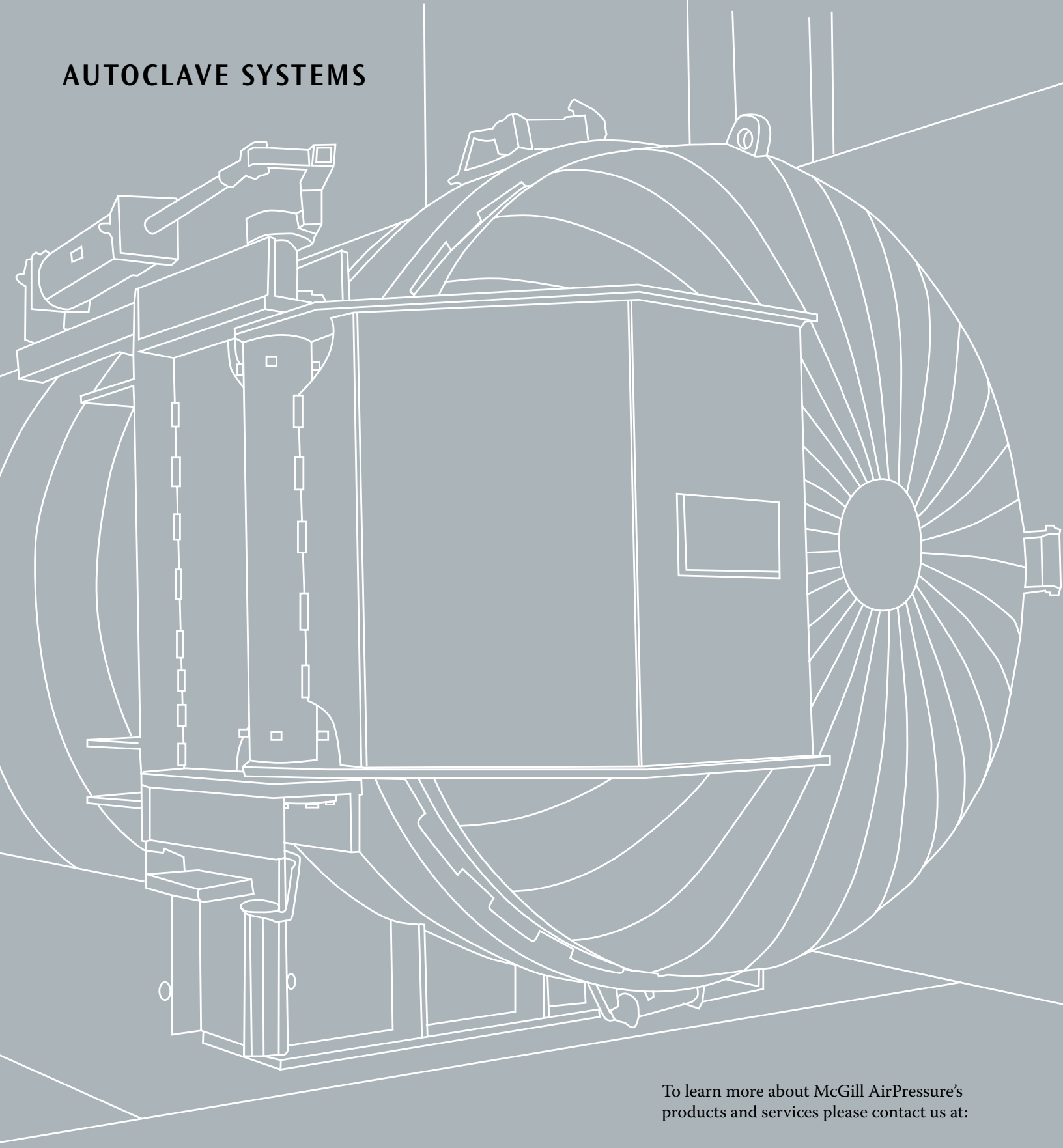
1. *McGill AirPressure will replace a damaged door hinge with our more durable design that reduces door alignment problems.*
2. *When emergency repair services are required, our skilled technicians and engineers will get your equipment back in production quickly.*
3. *Replacement parts such as fan shafts are manufactured to original specifications.*
4. *We stock gasket materials and profiles for all types of McGill autoclaves and pressure vessels, so we can fill your gasket orders quickly.*

AUTOCLAVE SYSTEMS



To learn more about McGill AirPressure's products and services please contact us at:

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